that it could easily be shown to consist of three layers. The outer layer is very thin, colorless, and covered with fine warts; the middle layer is the thickest and is yellowish and smooth; the inner layer appears tolerably firm and is also yellowish and smooth. The uredospore is provided with from three to four equatorial germ pores, and the membrane is not equally thick everywhere, but is not especially thickened at the base of the spore. Treated in the same manner the epispore of the teleutospores showed the same three layers; the warts on the outer layer are somewhat larger and do not stand so close together as on the uredospores. The teleutospores are characterized by a long hyaline pedicel which breaks off at the base and remains in connection with the spore. The pedicel tapers below and is hollow in the lower portion. It is not perfectly smooth everywhere, but a small wart occurs here and there. Probably Peck called this species *mirabilissima* on account of the strikingly long pedicel, but it deserves this epithet in a still higher degree on account of another peculiarity that has been hitherto overlooked. One of the main characters of the genus *Puccinia* is, as we know, that each cell of the teleutospore is provided with but one germ pore which can have different positions, but in *P. mirabilissima* this is not the case, for here is each cell of the teleutospore with two opposite germ pores. These show plainly when the spores are treated as above mentioned. In this respect *P. mirabilissima* varies from all other Puccinia that have been carefully observed, and even in this peculiarity I see a point of union between the genera *Puccinia* and *Phragmidium*. It would be of interest to study the germination of this peculiar species, and it is to be hoped that some one of my North American colleagues, to whom living specimens are accessible, will undertake it.

QUITO, ECUADOR.

NOTES.

A NEW PEAR DISEASE.

Something over a year ago we received from one of our correspondents in southern Alabama a number of pear branches affected in a peculiar manner. In a letter sent with the specimens our correspondent described the disease as follows:

> The disease appears in the form of spots on the trunk of the tree, always at a dormant bud, also on the branches at the base of another branch or fruit spur. The spots when first noticed were about one-quarter of an inch in diameter, but soon increased to four or five times this size. They are nearly round and are surrounded with whitish uneven edges. When one-half an inch or more in diameter the affected portion becomes depressed and upon cutting into it the bark cambium and a considerable portion of the wood is seen to be brown and dead. In no case has the affection entirely encircled a branch or trunk, but I have no doubt that if allowed to continue it will do so in a short time. I have never seen the disease before and fear it will prove troublesome in my orchard.

Upon examination of the specimens it was found that the disease was due to a fungus known as *Thelephora pedicellata*, Schw. We have this

parasite, for so we must regard it, from New Jersey on oak (*Quercus cocinnea*), Florida on palmetto (*Sabal palmetto*), and Texas on cultivated apples. From this it will be seen that it is not particular as to hosts or locality. There is no doubt that on trees having such soft, tender bark as the pear and apple the fungus will readily obtain a foothold and prove a very serious enemy. An allied species (*T. perdix*, Hartig) occurs in Europe on oak, causing what is known as "partridge wood." In this case the wood becomes a deep brown; then white spots appear upon these discolorations, giving to the affected parts a mottled appearance, hence the name.

To our correspondent's inquiries concerning the cause of the disease and its treatment we gave in reply to the first question substantially what is stated in the foregoing remarks, suggesting by way of an answer to the inquiries concerning treatment that he cut out all the diseased wood and, after washing the wounds thoroughly with a saturated solution of sulphate of iron or copperas, apply grafting wax or something similar. Our suggestions were complied with to the letter, excepting that a coat of shellac dissolved in alcohol was used instead of grafting wax.

A few days ago we received a note from our correspondent saying that the treatment had proved entirely successful. The wounds healed readily and the trees which a year ago bore every indication of approaching death are now as vigorous as any in his orchard.—B. T. GALLOWAY.

DISEASE OF GERANIUMS.

For a long time we have noticed a disease of geraniums which attacks the stems, causing them to turn black, shrivel, and sometimes become soft and mushy. The trouble is not confined to any particular variety, nor does it seem to be influenced to any great extent by soil or climate. It is a very troublesome thing in greenhouses, especially among cuttings, which it often destroys by the thousand. Cuttings attacked by the disease begin to turn black at the severed end, the discolorations rapidly extending upward until the whole stem is involved. Occasionally the disease stops after an inch or more of the cutting is destroyed; but even if this takes place the plant eventually dies as soon as the supply of nourishment in the green portion is exhausted. Cuttings rooted in the bench are not so apt to suffer from the disease as those immediately potted. The disease is also more troublesome where immature wood is used and when too much water is applied immediately after the cuttings are potted.

Microscopic examination of the diseased tissues has so far revealed nothing in the shape of a fungus excepting where the wood has become soft, where, as might be expected, a number of saprophytic forms occur. Sections through portions of the stem as at *a* Fig. 1, where the disease is actually at work, reveals under the microscope immense numbers of bacteria, in some cases almost filling the cells and often escaping into the water in sufficient numbers to make the latter appear milky.

Cultures made from the diseased wood on gelatine, agar-agar, potato, etc., usually show at the expiration of from 24 to 48 hours numerous colonies of bacteria which are for the most part of one kind, namely, a *Bacillus*.

As yet no inoculations have been made with the organism itself, but the disease has been produced in a number of cases by inoculations directly from diseased wood. Figure 2 shows the result of one of these inoculations, *a* being the point where the knife entered the tissue. The disease is one certainly worthy of careful investigation, as the losses in one establishment last year in this city amounted to over 50 per cent.

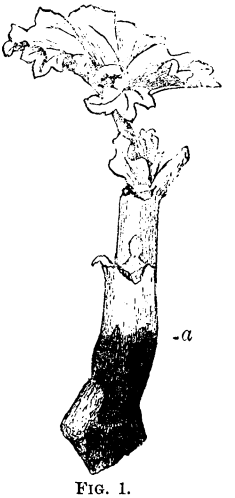

FIG. 1.

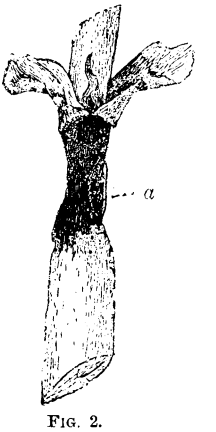

FIG. 2.

FIG. 3.

Our object in writing this preliminary note is to call the attention of florists and others directly interested in the matter to the work we now have under way and to obtain from them any information bearing on the subject they may consider of value.

A disease which may be the same as the one here referred to has recently been reported from France by Messrs. Prillieux and Delacroix.*

According to these writers *Pelargonium* and potato stems are affected with a malady which causes them to turn black and become rotten. The disease has been transferred from the potato to the *Pelargonium* and vice versa. A *Bacillus*, which the authors believe to be the cause of the trouble and which has received the provisional name of *B. caulicolous*, Pr. and Del., has been found associated with the disease. No mention is made of the disease having been produced by inoculating with the organism, although it is claimed that this can readily be done by direct inoculation.—B. T. GALLOWAY.

ADDITIONAL OBSERVATIONS ON ANTHRACNOSE OF THE HOLLYHOCK.

Since the last issue (Vol. VI, No. 2) of the JOURNAL OF MYCOLOGY some additional facts have come to light concerning the *Colletotrichium* on the hollyhock.

* Comptes Rendus t. CXI, p. 208.

A fungus exactly like it in appearance has been found on *Sida spinosa* by Mr. W. T. Swingle at Manhattan, Kans. Some attempts at producing the disease on hollyhock by the spores from *Sida* have been made, but as far as known they have not been successful. This might easily be accounted for by the lateness of the season and consequent low temperature, and it seems almost certain from a comparison of the fungi that they belong to the same species.

Dr. P. A. Saccardo writes that the fungus is probably not a new species at all, but was described in 1854 by Braun and Caspary as *Steirochæte malvarum* on *Malva* in Europe (Sacc. Syll., IV, 316). The descriptions certainly agree in many respects, but the description in the Sylloge reads, "Conidiis ex pseudostromate immediate (ut videtur) orientibus," and the spore measurements are given as 8–9 x 3–4 μ. In the fungus on hollyhock there was no question as to the spores being borne on basidia and they measured 11–28 x 5 μ. The fact of the spores being borne an basidia may, however, have been overlooked, and as the spores vary greatly anyway, the difference in size is not sufficient reason for making a new species.

After comparing the two descriptions it seems very probable that the fungus must stand as *Colletotrichium malvarum*, (Br. & Casp.).

There also seems to be a possibility that *Steirochæte graminicola*, (Ces) Sacc. may be identical with *Colletotrichium bromi*, Jennings, an undescribed species on *Bromus secalinus*, noted in Bull. 9 of the Texas Experiment Station.—E. A. SOUTHWORTH.

LEPTOTHYRIUM PERICHYMENI, DESM.*

Specimens of what seemed to be this species on *Lonicera*, sent this season from Perry Sound, Ontario, Canada, by Mr. Dearness, have the sporules (pseudo) septate near the lower end and agree accurately with the description and specimens of *Marsonia lonicerœ*, Hark., except in being mostly shorter ($22-30\times7-9\mu$). European specimens in Thüm. M. U. 1893, Kunze, F. Sel. 591, Linhart 474 and F. G. 4674 do not show any septum, though the F. G. specimens show some indications of one. The European specimens also have the sporules less attenuated below. In the specimen from Dearness and Harkness the lower part of the sporule is so much narrowed as to appear like a stipe or pedicel. The Canadian and Californian specimens are certainly the same and can not be referred to *Marsonia*, as they have a very distinct scutellate perithecium of radiate fibrous texture. We propose to designate the American form as *Leptothyrium perichymeni*, Desm. var. *Americanum*, E. & E.—J. B. ELLIS and B. M. EVERHART.

A NEW USTILAGO FROM FLORIDA.

USTILAGO NEALII, Ell. and Anders., n. s. On *Heteropogon melanocarpa*, Lake City, Fla. Prof. J. C. Neal, collector, 1890.

Attacking the inflorescence. Spore masses firm, blackish brown, fill-

*Sacc. Syll. III, p. 626.

ing the ovaries, frequently transforming a whole spikelet into a solid mass of spores enveloped in a whitish to buff-colored tegument. The lower lateral solitary spikelets, when attacked, are changed into irregular roundish knots, or nodules, as large a medium sized pea. Spores roundish, oblong, oval or ovate and variously compressed; contents pale olivaceous, epispore smooth, reddish brown; general color of spore a bright warm brown, slightly olive tinged, 6–10 μ wide, by 6–14 μ long. J. B. ELLIS and F. W. ANDERSON.

REVIEWS OF RECENT LITERATURE.

KELLERMAN, W. A., AND SWINGLE, W. T.—*Preliminary experiments with fungicides for stinking smut of wheat.* Bulletin No. 12.—August, 1890. Botanical Department of the Experiment Station, Kansas State Agricultural College, Manhattan, Kans.

The wisdom of the recent establishment of State experiment stations by the General Government has been called in question in certain quarters. Nevertheless, the stations are here to stay, and their public usefulness becomes more and more apparent, especially after reading such a paper as this from the Kansas station. The results are striking and conclusive, and worth more to the wheat-growers of this country than the cost of all the stations.

In the main these experiments are a repetition and confirmation of those made in Europe by Jensen, Kühn, and others. Fifty-two treatments were given for the prevention of stone smut in wheat (*Tilletia*). The substances experimented with were:

Hot water of various temperatures; lye of different strengths; solutions of copper sulphate with and without lime, and of different strengths; Bordeaux mixtures, full and half strength; eau celeste; solution of sodium hyposulphite, with and without lime, and of different strengths; solution of potassium sulphide, with and without lime, and of different strengths; arsenic; lime; salt; soap; cistern water; chloroform; ether; sulphurous oxide; carbon bisulphide; ammonium hydrate; carbolic acid; sodium sulphate, bicarbonate and carbonate; potassium bichromate; mercuric chloride, and salicylic acid.

Fifty untreated strips, alternating with the treated ones and containing a total of 6,227 square feet, afford the basis for comparisons. The total heads produced on these 50 plats were by actual count 122,432, of which over seventy-one per cent. were smutted. The highest per cent. of smutted heads on any plat was 81.61 per cent.; the lowest was 53.54 per cent. The average number of bushels of sound grain per acre (calculated) on 41 of these plats is only 4.68. By an oversight no calculation was made for the other nine plats, but these were much like the rest, and the average of the fifty could not have varied much from that here given.

Undoubtedly the yield was smaller and the per cent of smut greater owing to the fact that the grain was sowed in November and made a slow and feeble autumn growth. In this connection it is interest-